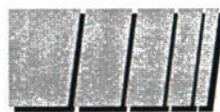


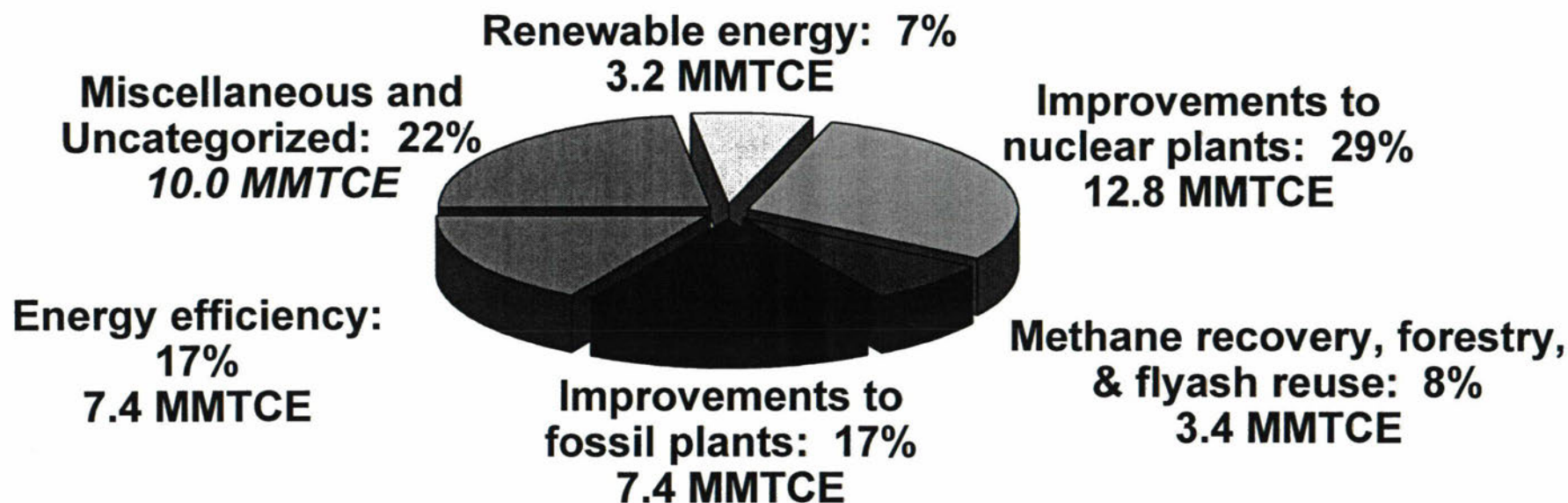
Jonathan



# ***U.S. Electric Utilities Have Shown Leadership in Pledging GHG Reductions***

- ✦ 120 signed agreements
- ✦ over 600 utilities participating
- ✦ 69% of industry
- ✦ over 45 MMTCE pledged

## ***Pledged Reductions (normalized)***



Source: Climate Challenge Participation Accords, DOE estimates. Note: Estimates are normalized and include international actions and trace gases., and are based on pre-March 1997 data.

1 MMTCE= 1 million metric tons of carbon equivalent emissions = average annual emissions from electricity consumed by 600,000 homes.

***U.S. Department of Energy Climate Challenge Program***

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# **Climate Challenge Program Report**

**December  
1996**



Energy Efficiency and Demand-Side Management

Fossil Generation Efficiency and Fuel Switching

Renewable Energy Resources

Nuclear Capacity and Capacity Utilization

Efficient Transmission and Distribution

Use of Coal Combustion By-Products

Carbon Sequestration

Methane Capture

Transportation Programs

International Programs

Miscellaneous GHG Reduction Program

Education and Community Service



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# CLIMATE CHALLENGE

Summer 1997

Volume 2, Number 3

*A Partnership of the U.S. Electric Industry and the U.S. Department of Energy*

## **HL&P AND RICE UNIVERSITY WORK TO REDUCE AGRICULTURAL METHANE EMISSIONS**

Researchers at Rice University in Houston have discovered that by draining rice fields as many as three times during the growing cycle the methane emissions—a potent greenhouse gas—can be virtually eliminated. During a 20-year period the global warming potential of methane is 56 times greater than that of carbon dioxide. For nearly a decade now, research on trace-gas emissions from natural and agricultural wetlands has been conducted at the Wetland Center for Biogeochemical Research at Rice University. Much of the research has been funded by Climate Challenge participant Houston Lighting & Power Co. (HL&P).

According to the Center, the global concentration of atmospheric methane is increasing at a rate of about 1% per year. Much of this increase can be attributed to emissions from flooded rice fields. In

addition, to meet the rice demand of growing populations, rice cultivation will have to increase by about 47% between 1990 and 2020 just to maintain current nutritional levels.

Because of variations in the natural and cultural components of rice-growing systems, methane emission rates vary widely, making it extremely difficult to accurately calculate a total for annual global methane emissions. Researchers estimate that about 20% of methane emissions come from rice agriculture worldwide. Rice University researchers believe that if methane from rice fields can be reduced to a negligible amount, we can stop the growth in methane concentrations. They have found that methane emissions from soil bacterial activity in agricultural wetlands is influenced by floodwaters.

*(Continued on pg. 3)*



**Researchers from Rice University, with assistance from Houston Lighting and Power, are working in Rosenberg, Texas, to investigate methane production associated with rice agriculture.**

## **Issue Analysis**

### **MARKET-BASED TRADING IN GREENHOUSE GASES FACES MANY HURDLES**

At a July 1996 meeting of international climate change negotiators in Geneva, the U.S. delegation first announced a shift in policy toward endorsing binding targets and away from voluntary limits or reductions for greenhouse gases such as carbon dioxide (CO<sub>2</sub>). While calling for binding targets, U.S. negotiators stressed the need for maximum flexibility in achieving any agreed upon goal. Flexibility in reaching targets was also emphasized by President Clinton in his speech to a United Nations (UN) meeting in June 1997. At the earlier meeting, the United States specifically called for "the inclusion of activities implemented jointly on a global basis," and said international emissions trading must be part of any future regime.

If "activities implemented jointly" means parties from two or more countries reducing emissions in a partnership arrangement, then U.S. utilities, leaders in developing such projects, will be in an excellent position to take advantage of any opportunities written into any future protocol or legally binding document.

However, the call for international emissions trading will give pause to those familiar with the intricacies of setting up such programs. At the same time, the flexibility of market-based approaches does have wide appeal in the electric utility industry.

*(Continued on pg. 3)*



September 18, 1997

MEMORANDUM FOR TODD STERN, KATIE MCGINTY, GENE SPERLING & DAN TARULLO

FROM: DIRK FORRISTER

SUBJECT: SERIES OF CLIMATE CHANGE OUTREACH SESSIONS

---

At Todd Stern's direction, tomorrow we will begin a series of three meetings with industry leaders to discuss policy alternatives on climate change. Tomorrow's session draws vice presidents from a range of utilities, both large and small, from across the country. **We will meet from 3:00 - 4:00 p.m. in the Roosevelt Room.** This memo and materials provide some background for the meeting, and I hope you find it useful.

1. Agenda.

The meeting will cover two major topics, plus any other areas you want to explore:

- **International framework:** what do they view as the critical elements for the protocol that would garner their support? What do they view as "deal breakers" in terms of their ability to support? What type of target/timetable could they support (or at least not oppose)?
  - In general, this group supports most of the U.S. protocol framework -- and they want us to stick to our guns. At the outset, expect them to say how much they hate binding targets. But they understand our differences there and go on to support emissions trading, joint implementation and rational timing (10 year budgets, banking, borrowing), and flexibility to trade across all sectors, gases, sources, sinks.
  - Several of these companies are likely to support a target of 10 years if it doesn't end before 2020 -- so long as they get flexibility in banking, borrowing, JI, emissions trading, and all sources/sinks/gases. If we lose on the flexibility features, they will likely oppose completely.
- **Early action incentives:** is there a way to advance an early action program as part of the President's policy announcement? Is there a way to reconcile industry's interest in encouraging early action with the uncertainty about the domestic policy design? This group has strong views favoring early action rewards -- they want to be good guys and get ahead of the game in the emerging emissions trading market. This evolves from the experience they had in the Clean Air Act's acid rain program where the early actors were rewarded in allowance allocations. Also, these companies have participated in the "Climate Challenge" with DOE -- and they want credit for good things they've done.
  - **Action Since 1990.** Since Under Secretary Wirth's first announcement about U.S. support for "binding targets," the utilities number one issue has been receiving credit for the good deeds they have done -- and they begin with wanting the Administration to honor the work they have done toward the year 2000 aim.
  - **More Action.** But beyond the interest in credit for action to date, this group has been thinking about how to follow up on the comments of Fred Buckman (CEO, PacifiCorp) and Linn Draper (CEO, American Electric Power) in the August 4th meeting with the President. Buckman said that in order to justify a reasonable target/timeframe in environmental terms, he understood that it would help the President if industry could offer beefed up voluntary commitments to cover the period leading up to the budget period -- and Buckman thought many in industry would be interested in stepping forward. (I've attached Buckman's letter to the President following up on these remarks.)



## 2. Participants.

- **Dale Heydlauff, Vice President for Environment, American Electric Power.** His CEO, Linn Draper, attended the meeting with the President. Based in Columbus, Ohio, AEP serves a seven state region in the industrial midwest, and its resource base is 85% coal. It is an active participant in the SO<sub>2</sub> trading market, and given that experience, AEP supports emissions trading as the most efficient approach to climate change. They are partners in joint implementation pilot projects and strongly support JI, given this experience. AEP has an international subsidiary exploring power projects in several developing countries.
- **Kevin Lynch, VP for Government Affairs, PacifiCorp--** his CEO, Fred Buckman, also attended the August 4 meeting with the President. Based in Portland, Oregon, PacifiCorp serves customers in seven Northwestern States and is the single largest coal burning utility west of the Mississippi River. They strongly support joint implementation and emissions trading, having experience in JI pilot projects. In general, PacifiCorp tries to be a progressive force on environment -- and is in an interesting position on climate change, given their plans to purchase a British energy company that owns the largest coal company in the free world -- Peabody Coal. Their international subsidiary is active in several developing countries, Australia and the UK.
- **Jerry Golden, VP for Environment, Tennessee Valley Authority--** Based in Knoxville, TN, TVA is among the largest coal burning utilities in the country -- and also one of the largest hydropower utilities. It serves customers in seven states. As a federal utility, TVA's charter includes strong requirements for resource stewardship. In the past, TVA has taken progressive positions ahead of private industry colleagues on environmental issues, notably acid rain. They were a key force in moving industry to adopt the "Climate Challenge" voluntary commitments -- as they were the first big coal burner to sign on. Recently, TVA convened a group of moderate utilities and the Environmental Defense Fund to explore enhancing the Climate Challenge commitments.
- **Ray Harry, Director of Environmental Policy, The Southern Company--** Based in Atlanta, GA, Southern is one of the nation's biggest coal burning utilities with customers in 3-4 states (GA, AL, FL, MS). They are a major participant in the acid rain trading program. They are very cautious about climate change -- a member of both the Global Climate Coalition and the Climate Council (the furthest group to the right). That said, they support joint implementation and other flexibility measures. They also have an international subsidiary that has been active in purchasing electricity distribution systems in the UK and in pursuing power projects in developing countries.
- **Tom Fair, VP for Environment, (or Marty Smith), Niagara Mohawk:** Niagara Mohawk is a mid-sized New York utility based in Syracuse, New York. They are well versed in emissions trading -- and in 1994, they launched an innovative CO<sub>2</sub> credit trade to Arizona Public Service Company for SO<sub>2</sub> allowances as a demonstration of their commitment to emissions trading and innovative environmental management. (They donated the SO<sub>2</sub> credits to the American Lung Association, I think, and sought to invest the tax-benefit in further CO<sub>2</sub> mitigation). This company committed to stabilize its emissions at 1990 levels through 2000, and it has offered excess credits below that baseline to other utilities, ala the trade with APS.
- **Wade Stancil, Director for Environmental Affairs, Texas Utilities:** based in Dallas, Texas, TU serves a growth market in north-central Texas. They have a strong base in lignite coal-fired plants, but they also brought on some nuclear generation in recent years, improving their CO<sub>2</sub> picture. They have been refreshingly positive on climate change, taking actions like planting massive numbers of short trees in their transmission corridors and rights of way.
- **Dennis Nelson, General Counsel, Tucson Electric Company:** Based in Tucson, Arizona, TEC is a mid sized utility serving customers in that region, as well as in California through their subsidiary in that competitive market. In addition, TEC is very active in joint implementation through its international affiliate and renewables technology (owns a solar subsidiary). TEC strongly supports JI and emissions trading.



- **Robert Kappleman, Sr. Environmental Advisor, Jacksonville Electric:** Kappleman is representing the Large Public Power Council (chairs their environmental committee) and the American Public Power Association (100's of municipal systems across the nation). LPPC is traditionally progressive on environment, and they are currently reviewing a resolution in support of much of our protocol framework. Compared to the others here, he is small -- but can be influential with lots of city-owned systems.
- **Robert Beck, VP for Environment, Edison Electric Institute:** This association represents the largest investor owned utilities in the nation. EEI launched five industry wide initiatives to undergird the Climate Challenge, including a joint implementation fund (\$600 million invested to date) and an environmental technology fund of \$50 million or more. Beck is very influential with large utilities across the country and has a good sense of the policy priorities of companies not here today.

### 3. Background Materials.

I have gathered some information in the attached folder for your review to give you a sense of the utility industry's recent approach to climate change:

- **The Climate Challenge Accord:** In the President's 1993 Climate Change Action Plan, utilities were more supportive than any other sector. The electric utility trade associations (and TVA, which does not belong to any associations) stepped forward to sign an umbrella agreement with Secretary of Energy Hazel O'Leary in a tent on the mall surrounded by climate technology booths sponsored by individual companies -- which for the first time put their company names on display next to positive statements about action to combat climate change. Vice President Gore was present at the signing -- and at the urging of the crowd, he signed the agreement as well.
- **Climate Challenge Participation Accords:** Under the umbrella agreement, individual utilities developed "participation accords" committing to one of five types of commitments (ranging from reductions from 1990 or stabilization at 1990 to softer commitments to undertake a set of specific greenhouse gas mitigation actions. Small electric cooperatives and small town municipal systems usually signed on in groups by state. At last count, DOE had signed 120 agreements covering over 600 individual utilities. I have attached some samples from companies that will be present to give you a flavor of these action plans.
- **Climate Challenge Program Report 1996:** This booklet summarizes the industry's activities in the Climate Challenge.

# The Climate Challenge Accord

The Climate Challenge Program is a joint, voluntary effort of the U.S. Department of Energy and the electric utility industry to reduce, avoid or sequester greenhouse gas emissions.

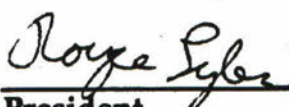
It reflects the intention of the parties to play a leadership role in pursuit of the President's goals for reducing greenhouse gas emissions.

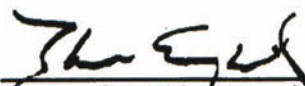
The parties by today's Memorandum of Understanding form the Climate Challenge Program. As representatives of the Department of Energy and the electric utility industry, we, the undersigned, do hereby execute the Climate Challenge Memorandum of Understanding, as of this 20th day of April, 1994.

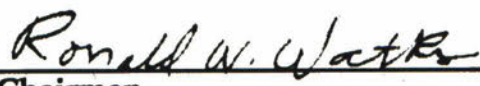
  
Secretary,  
United States Department of Energy



*W. T. ...*  
  
President,  
Edison Electric Institute

  
President,  
American Public Power Association

  
Executive Vice President,  
National Rural Electric Cooperative Association

  
Chairman,  
Large Public Power Council

  
Chairman,  
Tennessee Valley Authority





Tracy - The  
JIM DORSKIND: 8/21

Please coordinate  
the reply.

August 14, 1997

The President  
The White House  
Washington, D.C. 20500

Dear Mr. President:

I want to thank you for the opportunity to meet with you, the Vice President, and others from your Administration on the critical issue of climate change.

At our meeting, you outlined principles that the Administration plans to use to guide U.S. participation in international negotiations.

You also graciously invited the meeting participants to participate in the policy process as your Administration develops and asserts the United States' position prior to and at the Third Conference of the Parties in Kyoto later this year. PacifiCorp stands ready and eager to work with you on this profoundly important matter.

As we discussed, while there is disagreement over the issue of complete scientific certainty, it appears an international set of binding emissions targets and timetables is a global political inevitability. If such targets and timetables are truly reasonable, I believe much of the business community will work diligently to find cost-effective ways to implement them.

Reasonable targets and timetables must:

- ◆ include all countries and not harm U.S. economic interests relative to our international competitors;
- ◆ cover all sectors of the economy so that each sector contributes its proportionate share to the solution;
- ◆ include all important carbon-based greenhouse gases to ensure achievement of environmental goals;
- ◆ provide an adequate timetable for compliance to allow for the orderly depreciation of our capital assets and those of our customers; and,



The President  
August 14, 1997  
Page Two

- ♦ allow all forms of flexibility to lower the cost of compliance as much as possible. For PacifiCorp, flexibility means there must be credit for all legitimate efforts to reduce emissions or sequester carbon, trading across borders, credit for international projects (i.e., Joint Implementation), and credit for early emission reductions or sequestration projects.

Without a reasonable timetable and all necessary flexibility, a climate change protocol will find little public support. With flexible implementation, achievement of the target goals becomes increasingly possible at lower economic cost.

In the interim, voluntary measures can create a glidepath toward more formal targets to address climate change. Both Dr. Draper and I pointed to the many successes of the utility industry which has already begun implementing emission reductions and offset projects on a voluntary basis.

The successes of our voluntary efforts to date suggest there is more we and others can do to address climate change concerns. The Administration can assist us in this regard in two tangible ways.

First, we have undertaken these voluntary efforts with no clear policy to provide emissions credits. We are risking our investments of time and resources not only to begin efforts to reduce greenhouse gases now, but also with the expectation that PacifiCorp will receive tangible credit for these at a later time. A governmental commitment to credit for early reductions will provide a strong incentive for PacifiCorp and others to increase voluntary actions.

Second, the voluntary effort must be broadened beyond utilities. As is evident by the statements of other participants in the August 5 meeting, industry leaders are willing to take action if asked. Your leadership in seeking voluntary reductions from all US emitters would significantly advance this cause.

There are important initiatives underway within the business community and among some environmentalists to explore methods of stepping up voluntary efforts and to pool credits all in advance of a mandatory program. I commend this effort to you in hopes that the administration gives it full support. PacifiCorp will aggressively pursue these voluntary actions if assured that appropriate credit is ultimately provided.



The President  
August 14, 1997  
Page Three

There are also efforts ongoing to give substance to the type of framework the US can advocate which allows for the type of flexible implementation I previously described as absolutely essential to any acceptable protocol. You also have my commitment that PacifiCorp will work with your Administration and other interests to help shape that framework.

Once again, I sincerely thank you for the opportunity to meet with you and am encouraged that you are taking a very personal interest in this issue. I hope, through this letter and subsequent discussions, PacifiCorp can remain fully engaged in your difficult deliberations regarding our country's position at Kyoto. I personally pledge our support in your efforts and very much look forward to our continuing dialogue.

Sincerely,

A handwritten signature in dark ink, appearing to read "Fred Bushnell", with a long horizontal flourish extending to the right.

cc: The Vice President  
Mr. Dirk Forrister  
✓ Mr. Todd Stern



# **Climate Challenge Participation Accord**

## **DOE's Energy Partnerships for a Strong Economy**

---

### **Climate Challenge Participation**

#### **Accord Between The Southern Company**

#### **and the**

#### **United States Department of Energy**

This Accord describes the commitments that The Southern Company and the U.S. Department of Energy (DOE) have made to participate in the Climate Challenge Program in pursuit of the President's goals for reducing greenhouse gas emissions. The Climate Challenge Program is a joint, voluntary effort of DOE and the electric utility industry to reduce, avoid, or sequester greenhouse gas emissions. The framework of the Climate Challenge Program was established in the Climate Challenge Program Memorandum of Understanding (MOU) and exhibits thereto dated April 20, 1994 (the Climate Challenge Program MOU.) (See Attachment B to this Participation Accord.)

The Southern Company is the parent firm of one of the nation's largest investor-owned electric utility groups. The company includes five operating utilities - Alabama Power, Georgia Power, Gulf Power, Mississippi Power, and Savannah Electric - as well as Southern Nuclear and Southern Electric International.

### **I. Utility Commitments**

#### **A.**

Consistent with paragraph II.B.1 of the Climate Challenge Program MOU,

The Southern Company will participate in the following industry

initiatives:

- 1) National Earth Comfort Program
- 2) Electric and Renewable Energy Investment Pool
- 3) Utility Forest Carbon Management Program, and
- 4) EV America



The Southern Company will also undertake projects in the following areas:

- 1) Transportation
- 2) Forestry
- 3) End-Use
- 4) Supply-Side
- 5) Transmission
- 6) Distribution
- 7) Recycling, and
- 8) Other government/industry initiatives

A description of these programs is provided in Attachment A.

B.

The Southern Company will report annually on activities and achievements under the Climate Challenge Program. Results achieved during each year shall be reported in a clear and understandable manner that is consistent with the guidelines adopted pursuant to subsection 1605(b) Energy Policy Act and the Climate Challenge accounting protocols in Exhibit B of the Climate Challenge Program MOU. The first such report may include a description of the activities and achievements of The Southern Company prior to its becoming a participant in the Program, expressed on an annual basis to the extent possible.

C.

The Southern Company will confer with DOE on or before July 1, 1996, to evaluate jointly the progress of the company in achieving its Climate

Challenge Programs goals and to discuss possible adjustments to its voluntary commitments.

D.

The Climate Challenge Program representative for The Southern Company will be Charles H. Goodman, Vice President, Southern Company Services, Post Office Box 2625, Birmingham, Alabama 35202. The Southern Company agrees to notify DOE prior to or, in any event, no later than 30 days after any change in liaison responsibilities or personnel.

## II. DOE Commitments

A.

DOE's commitments to The Southern Company are those set out in section III of the Climate Challenge Program MOU, which are hereby incorporated in this Participation Accord by reference.

B.

DOE will consider requests by The Southern Company to intervene in regulatory proceedings of federal, state, and local commissions and boards on issues pertinent to the Climate Challenge Program. Before DOE intervenes in regulatory and other proceedings pertaining to The Southern Company and/or its operating subsidiaries for purposes of addressing Climate Challenge Program issues, it will provide notice to The Southern Company.

C.

DOE will provide an annual report to The Southern Company describing the actions that it has

taken to fulfill its commitments under section III and Exhibit C of the Climate Challenge Program MOU and the results of those actions.

D.

The Climate Challenge Program representative for DOE, who will serve as liaison to The Southern Company, will be Allan Hoffman, Department of Energy, Room 6B-128 (EE-10), 1000 Independence Avenue, S.W., Washington, DC 20585; Telephone: (202)586-1786. DOE agrees to notify The Southern Company prior to or, in any event, no later than 30 days after any change in liaison responsibilities or personnel.

### III. General Provisions

A.

Use of DOE-developed materials by The Southern Company will be governed by the provisions of section IV of the Climate Challenge Program MOU, which are hereby incorporated in this Participation Accord by reference.

B.

In addition to the foregoing provisions, DOE and The Southern Company agree to act in accordance with the principles set out in section I of the Climate Challenge Program MOU and the general provisions set out in subsections V.A-V.D, V.F, and V.G of the Climate Challenge Program MOU, which are hereby incorporated by reference.

C.

Either party may withdraw from this Participation Accord or any of its activities under the Climate Challenge Program without penalty and without being subject to remedies at law or equity.

---

A.W. Dahlberg  
President  
The Southern Company

February 3, 1995

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Hazel R. O'Leary  
Secretary  
U.S. Department of Energy

February 3, 1995

#### Attachments:

Attachment A -- Commitments of The Southern Company under the Climate Challenge Program

Attachment B -- Climate Challenge Program Memorandum of Understanding and Exhibits

(Attachment A)

**Commitments of The Southern Company**

**under the**

**Climate Challenge Program.**

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## **Attachment A.**

### **The Climate Challenge Program**

#### **Commitments of The Southern Company**

#### **INDUSTRY INITIATIVES**

##### **1. National Earth Comfort Program**

The Southern Company will participate in this program to increase the market penetration of ground source heat pump technology. Present financial requirements for participation are \$50,000 per year from 1995 through the year 2000 for a total investment of \$300,000.

##### **2. Electric and Renewable Energy Investment Pool**

This fund will provide venture capital for companies to produce and introduce into the market electric and renewable energy technologies that will reduce emissions of greenhouse gases. The Southern Company will invest up to \$5 million into the fund for the years 1995 through 1999. If additional funding pools are created as part of this initiative, The Southern Company will consider additional investments in those funding pools.

##### **3. Utility Forest Carbon Management Program**

This initiative will leverage the resources of numerous utilities to undertake carbon sequestration projects. The Southern Company plans to commit \$200,000 for the years 1994 through 2000 upon satisfactory development of the program.

##### **4. EV America**

This program is designed to enhance the development and demonstration of electric vehicles by having utilities introduce them into their fleets. Alabama Power Company and Georgia Power Company are founding members of this program. The Southern Company will introduce 100 electric vehicles into its fleet operations by the year 2000 under the EV America program.

#### **COMPANY SPECIFIC INITIATIVES**

##### **1. Transportation**

Between the years 1995 and 2000, The Southern Company will expend \$63 million in programs to place electric vehicles into the transportation marketplace. This will include the introduction of some 1,400 electric vehicles into the fleets of The Southern Company's operating subsidiaries. (This commitment does not include the EV America commitment of 100 vehicles.)

##### **2. Forestry**

The Southern Company will expend the following on programs to address sequestration of carbon from the atmosphere over the years 1994 through 2000:

|             |                                                                 |
|-------------|-----------------------------------------------------------------|
| \$300,000   | Smithsonian Tropical Research Institute                         |
| \$700,000   | Improvements on existing Company lands                          |
| \$3,800,000 | Development and implementation of programs not on Company lands |



The allocation between company and non-company land may be revised based on further evaluation of the available opportunities. These programs will be long term with results extending beyond the year 2000.

### **3. End Use Programs**

#### **Demand Side Management (DSM)**

##### **1991 - 1994**

The DSM programs in place include the promotion of new energy efficient homes, low-income housing energy efficiency kits, technical assistance to businesses, time-of-use and pricing incentives, and additional programs.

##### **1995 - 2000**

The operating subsidiaries of The Southern Company will continue to implement and improve programs to help electric customers use energy in the most efficient manner. These programs will continue to be refined, based on market conditions and Integrated Resource Plan requirements. The Southern Company is committed to undertake a portfolio of DSM programs during this time period. A description of the plans is provided in the current Integrated Resource Plan of The Southern Company. The activities are projected to reduce energy consumption by more than 2 million MWh annually in 2000. Southern Company anticipates aggregate expenditures of approximately \$25 million on DSM over the next 5 years.

In addition, as part of The Southern Company's overall commitment to DSM programs we plan to: 1. Seek appropriate regulatory solutions to overcome economic barriers;

2. Continue to investigate additional economic programs; 3. Continue to sponsor, participate in, and seek out appropriate government-sponsored programs; and 4. Support the passage and enforcement of cost effective and energy efficient building codes and appliance and equipment standards.

#### **Electrotechnology Development**

Over the next 5 years, The Southern Company will operate the Technical Application Center for the promotion and development of electrotechnologies and will support the research of viable electrotechnologies. Electrotechnologies allow the substitution of electric equipment for manufacturing and other applications where other fuels or less efficient electric equipment are presently used. Their use may result in a net reduction of greenhouse gas emissions. The Company anticipates that operating expenditures for the Center will total \$5 million over the next 5 years. In addition, The Southern Company will invest over \$1 million over the next 5 years for additional research into electrotechnologies.

### **4. Supply Side Programs**

The Southern Company will implement programs to continue and enhance past gains in efficiency at its electric generating plants. This focus on efficiency lowers the amount of fuel needed to provide each unit of energy from the plants.

##### **1991 - 1994**

#### **Fossil Efficiency Improvements**



From 1990 to 1993, fossil fuel fired plants in The Southern Company improved their average net heat rate from 9,810 Btu/kWH to 9,721 Btu/kWH.

### Heat Rejection Improvements

Since 1990, cooling tower system upgrades have included 1800 MW and 3300 MW of fossil and nuclear-fueled generation, respectively. Upgrades have been achieved through media replacement, helper cooling towers, redesign, and chemical additives. These upgrades improve the condenser heat exchange of a generating unit and thus its operating efficiency.

### Nuclear

The Southern Company owns 100 percent of Plant Farley, 50.1 percent of Plant Hatch, and 45.7 percent of Plant Vogtle. Nuclear generating plants do not emit greenhouse gases, and they reduce overall emissions by displacing generation from coal-fired baseload plants.

Between 1991 and 1994, the total annual generation of these three nuclear plants (including the co-owned portions) rose from 38,167,229 MWh to 42,134,134 MWh, an increase of more than 10 percent. Several factors have contributed to this increase: the total rated capacity of Plant Vogtle was increased by about 100 MW, routine refueling outages were completed in less time, and plant reliability and availability between refuelings were improved.

## 1995 - 2000

### Heat Rejection Improvements

The Southern Company will improve the steam cycle heat rejection equipment at several system generating plants prior to 2000. These improvements will result in more efficient production of electricity. The Company anticipates aggregate expenditures of approximately \$10 million over the next 5 years as outlined in current capital budgets.

### Other Efficiency Improvements

The Southern Company will implement other efficiency measures at system generating plants between 1995 and 2000. Plans for these improvements are described in the current capital budget of The Southern Company. The Company anticipates aggregate expenditures on these efficiency measures on the order of \$170 million over the next 5 years.

### Biomass

The Southern Company burns more than a thousand tons of wood waste each month to displace coal. This represents an increase above the pre-1990 levels. The Company will also investigate committing to further uses of biomass based on economics and tax treatment.

### Nuclear

The total rated capacity of Plant Hatch will be increased by approximately 80 MW during this time period, at a cost of about \$15 million (including co-owner shares). It is also expected that the reductions in refueling outage times that have been achieved will be sustained during this period, and improved levels of plant reliability and availability between refuelings will continue. Together, these factors will allow current high levels of nuclear production to be maintained or increased during the 1995 to 2000



period, decreasing the need for fossil-fueled generation.

### Cogeneration

The Southern Company subsidiary Mississippi Power Company upgraded the cogeneration facility at the Chevron refinery in Pascagoula, Mississippi to include a new 80 MW unit in 1994. This natural gas-fired facility produces electricity and process steam for a significant industrial customer and provides The Southern Company system with less CO<sub>2</sub> emissions as compared to coal-fired baseload capacity.

### Solar

The Southern Company will continue to implement programs to enhance the development and performance of solar generated energy including:

#### **Georgia Institute of Technology Aquatic Center**

Georgia Power Company, The U.S. Department of Energy, and the Georgia Institute of Technology are finalizing plans to fund and construct a photovoltaic array on the roof of the Aquatic Center at the university for the 1996 Olympics. Georgia Power's investment in the 300-kW facility will be \$1.8 million.

### Research

The Southern Company will invest \$8.2 million prior to 1998 in the Power Systems Development Facility (PSDF) located in Wilsonville, Alabama. In addition to The Southern Company, project partners include the U.S. Department of Energy, the Electric Power Research Institute, and others. The \$158 million project will develop and test advanced gasifier systems, advanced pressurized bed combustion, hot gas cleanup systems and fuel cells. This research will lead to technologies that increase the efficiency and environmental performance of electric generation.

## **5. Transmission**

The Southern Company is committed to undertake a portfolio of projects to maintain, improve and enhance the efficiency of existing transmission systems. The Company's plans are described in the current Integrated Resource Plan of The Southern Company. For instance, the Company will operate some of the transmission systems at a higher voltage profile, add new capacitors on the transmission grid, and substitute more efficient transformers. These projects are expected to reduce transmission losses by over 420,000 MWh per year by the year 2000. Over the next 5 years, the Company anticipates aggregate expenditures of approximately \$505 million on transmission system improvements that will maintain, improve, and enhance efficiency.

## **6. Distribution**

The Southern Company is committed to a portfolio of projects to maintain, improve and enhance the efficiency of the existing electric distribution system. The Company's plans are described in the current capital budget of The Southern Company. For example, The Southern Company will install lower loss transformers, improve distribution system automation, enhance system voltage optimization and improve phase current balancing and dispersed energy storage. These projects are expected to reduce distribution losses by about 15,000 MWh per year by the year 2000. Over the next 5 years, the Company anticipates aggregate expenditures of approximately \$374 million on distribution system improvements that will maintain, improve, and enhance efficiency.



## 7. Recycling

### 1991- 1994

Over the period from 1991 through 1994, The Southern Company reused almost 15 percent of total ash, totaling over 2.5 million tons of ash. During this same period, approximately 2,400 tons of paper were recycled. This represents an increase above the pre-1990 levels.

The Southern Company will continue and enhance existing programs to increase the recycling of waste material from its facilities and the specification of recycled material in product and supply purchases. For the period 1995 through 2000 these include:

|              |                                                                 |
|--------------|-----------------------------------------------------------------|
| \$ 2,100,000 | Development and testing of coal ash use in concrete             |
| \$ 2,000,000 | Purchase products made with recycled materials                  |
| \$46,000,000 | Installation of dry coal ash collection systems which recycling |

Recycled ash reduces the amount of raw materials needed in the manufacture of concrete and in roadbed construction, reducing the energy consumption necessary for their manufacture.

## 8. Other Government/Industry Initiatives

The Southern Company will continue to be a partner in other government/industry programs which will lead to reductions in greenhouse gas emissions. These include:

Green Lights (EPA) - Joined in May, 1993

Waste Wise (EPA) - Charter Member, July, 1994

Cool Communities (EPA, DOE, American Forests) - Georgia Power is a member of this program.

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# **Climate Challenge Participation Letter**

## **DOE's Energy Partnerships for a Strong Economy**

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### **CLIMATE CHALLENGE PARTICIPATION ACCORD BETWEEN NIAGARA MOHAWK POWER CORPORATION AND THE UNITED STATES DEPARTMENT OF ENERGY**

This Participation Accord describes the commitments that Niagara Mohawk Power Corporation ("NMPC") and the United States Department of Energy (DOE) have made to participate in the Climate Challenge program in pursuit of the President's goals for reducing greenhouse gas emissions. The Climate Challenge Program is a joint, voluntary effort of DOE and the electric utility industry to reduce, avoid or sequester greenhouse gas emissions. The framework of the Climate Challenge Program was established in the Climate Challenge Program Memorandum of Understanding and exhibits thereto dated April 20, 1994 (the Climate Challenge Program MOU). See Attachment A hereto.

#### **1. NMPC Commitments**

A.

Consistent with paragraph II.B.1. of the Climate Challenge Program MOU, NMPC commits to limit Company carbon dioxide (CO<sub>2</sub>) emissions (in tons) to its 1990 baseline level. NMPC also commits to maintain its CO<sub>2</sub> emissions at or below that level each year through the year 2000. The Company's 1990 baseline emissions and business activities included in the baseline will be documented in accordance with provision I.E. below.

B.

In support of the commitments in I.A., NMPC commits to undertake and will continue to undertake a variety of measures to limit its total greenhouse gas emissions. Examples of such measures which have been undertaken since 1990 or are expected to be undertaken in the future are attached as Attachment B.

C.



If in any year NMPC's baseline commitment level is not met, CO<sub>2</sub> reductions which are available from the cumulative total reductions achieved below the baseline level since 1990 through greenhouse gas reduction measures undertaken by NMPC, and which have not been transferred to any other party, will be applied to offset the exceedance (in tons) above the 1990 baseline CO<sub>2</sub> emissions level. If sufficient offsets are unavailable in any year, NMPC will determine the shortfall in tons of CO<sub>2</sub> and will investigate with DOE's assistance additional measures to limit or reduce such emissions.

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- D. NMPC will report annually on activities and achievements under the Climate Challenge Program. Results achieved during each year will be reported in a clear and understandable manner that is consistent with the guidelines adopted pursuant to subsection 1605(b) Energy Policy Act and the Climate Challenge accounting protocols in Supplemental Guidance on Commitment Definitions and Reporting of the Climate Challenge Program MOU ("Exhibit B").
- E. Within 90 days of the signing of this Accord, NMPC will submit to DOE an initial annual report (1) identifying company business activities and the corresponding CO<sub>2</sub> emissions total included in its 1990 baseline level, (2) documenting annual CO<sub>2</sub> emissions beginning in 1990, (3) listing measures undertaken since 1990 which reduce, limit, or avoid emissions of CO<sub>2</sub> and other greenhouse gases, and (4) reporting results achieved versus the 1990 baseline commitment on an annual and cumulative basis. NMPC will also include in this report for informational purposes estimates of CO<sub>2</sub> emissions resulting from other energy purchase commitments. The initial report will serve as the model under this Accord for future annual reporting by NMPC that is in addition to reporting under 1605(b).
- F. The commitments specified above will apply through the year 2000. NMPC and DOE agree to reopen or revisit this Accord by December 31, 1998, to address NMPC's continued participation in the Climate Challenge Program and the nature of NMPC's commitments after the year 2000.
- G. NMPC will confer with DOE on or before December 31, 1996 to evaluate jointly the progress of NMPC in achieving its Climate Challenge goals and to discuss possible adjustments to its voluntary commitments.
- H. The Climate Challenge representative for NMPC will be Dr. Martin Smith, Chief Environmental Scientist, NMPC, 300 Erie Boulevard West, Syracuse, New York 13202. NMPC will notify DOE prior to or, in any event, no later than 30 days after any change in the representative.

## II. Cooperation between NMPC, DOE and Other Utilities for Meeting Climate Challenge Program Objectives

- A. DOE, as outlined in the Climate Challenge MOU, and NMPC agree that the Climate Challenge should provide utilities with maximum flexibility to pursue cost-effective, customized strategies including but not limited to demand-side management, electrotechnologies, increased use of

renewable energy sources, forestry and other CO<sub>2</sub> sequestration activities, fuel switching, efficiency improvement, and international projects.

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B.

DOE, as outlined in the Climate Challenge MOU, and NMPC agree that the Climate Challenge should promote the development and demonstration of innovative methods to promote cooperative, joint utility efforts designed to support both national objectives related to global warming mitigation and individual utility environmental goals in an economically-efficient manner, including emissions reduction agreements between Climate Challenge participants to allow the participants to meet their Climate Challenge commitments in the most cost-effective manner.

C.

NMPC may transfer greenhouse gas emission reductions to other Climate Challenge participants, provided that the transferred emission reductions are below the baseline level and are:

1. The result of measures undertaken by NMPC; and
2. Not applied to offset NMPC emissions in another year in which NMPC emissions are in excess of the Company's 1990 baseline.

D.

NMPC agrees to provide DOE with a copy of any agreements covering transactions described in paragraph II.C. of this Accord.

### III. DOE Commitments

A.

DOE's commitments to NMPC are those set out in section III of the Climate Challenge Program MOU, which are hereby incorporated in this Participation Accord by reference.

B.

DOE will consider NMPC requests to intervene in regulatory proceedings of federal, state and local commissions and boards on issues pertinent to the Climate Challenge Program. Before DOE intervenes in regulatory and other proceedings pertaining to NMPC for purposes of addressing Climate Challenge Program issues, it will provide notice to NMPC.

C.

DOE will provide an annual report to NMPC describing the actions that it has taken to fulfill its commitments under section III and Exhibit C of the Climate Challenge Program MOU and the results of those actions.

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D.

The Climate Challenge Program representative for DOE, who will serve as liaison to NMPC, will be Allan Hoffman, U.S. Department of Energy, 1000 Independence Ave., S.W., Washington, D.C. 20585 --(202)586-1786. DOE will notify DOE prior to or, in any event, no later than 30 days after any change in liaison responsibilities or personnel.



- E. DOE will consider request to assist NMPC its interactions with other regulatory agencies or governmental authorities (including but not limited to IRS, EPA, NYS Public Service Commission) in furtherance of the goals or commitments set forth herein, including the implementation of any cooperative action with another utility for purpose of achieving Climate Challenge objectives.
- F. In a manner and to an extent consistent with Department policy, DOE will support recognition of greenhouse gas emissions reductions achieved through voluntary efforts in any future national programs to mitigate climate change.

#### IV. General Provisions

- A. Use of DOE-developed materials by NMPC will be governed by the provisions of section IV of the Utility Climate Challenge MOU.
- B. In addition to the foregoing provisions, DOE and NMPC agree to act in accordance with the following principles, statements and actions contained in the Utility Climate Challenge MOU, which are hereby incorporated by reference:
1. Principles - section 1.
  2. General Provisions - section V.A-V.D, V.F and V.G.
- C. Either party may withdraw from this Participation Accord or any of its activities under the Climate Challenge Program without penalty and without being subject to remedies at law or equity.

NIAGARA MOHAWK POWER CORPORATION

BY: \_\_\_\_\_

DATE: February 2, 1995

U.S. DEPARTMENT OF ENERGY

BY: \_\_\_\_\_

DATE: February 3, 1995

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# **Climate Challenge Participation Accord**

## **DOE's Energy Partnerships for a Strong Economy**

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### **Climate Challenge Participation Accord Between Tennessee Valley Authority And U.S. Department of Energy**

This **Participation Accord** describes the commitments that the Tennessee Valley Authority (TVA) and the U.S. Department of Energy (DOE) have made to participate in the Climate Challenge Program in pursuit of the President's goals for reducing greenhouse gas emissions. The Climate Challenge Program is a joint, voluntary effort of DOE and the electric utility industry to reduce, avoid or sequester greenhouse gas emissions. The framework of the Climate Challenge Program was established in the Climate Challenge Program Memorandum of Understanding and exhibits thereto dated April 20, 1994 (the Climate Challenge Program MOU), which is hereby incorporated by reference.

#### **1. TVA's Commitments**

A. Consistent with paragraph 11.B.1 of the Climate Challenge Program MOU, TVA commits to reduce its annual emissions of greenhouse gases by the equivalent of 22.7 million tons of CO<sub>2</sub> by Year 2000. Most of these reductions are relative to Year 2000 greenhouse gas emission levels for a modified reference case that was projected from the average of TVA's 1987-1990 baseline of approximately 92.7 million tons of CO<sub>2</sub> emissions by excluding the specific reduction activities identified in Attachment A from the production model of the TVA power system. The reference case and the business operations involved in the reference case are more fully described in Attachment B. TVA's commitment applies to all of the agency's activities including its power system program and appropriated-funded programs. This commitment and all other commitments established by this Accord are subject to the conditions stated in the Climate Challenge MOU, the results of TVA's integrated planning process activities, and satisfactory completion of any environmental reviews.

B. TVA will report annually on its activities and achievements under the Climate Challenge Program. Results achieved during each year shall be reported in a clear and understandable manner that is consistent with the guidelines adopted pursuant to subsection 1605(b) of the Energy Policy Act and the Climate Challenge accounting protocols in Exhibit B of the Climate Challenge Program MOU. The first such report may include a description of TVA's greenhouse gas reduction activities and achievements prior to execution of this Accord.



C. TVA will confer with DOE on or before January 30, 1996 to evaluate jointly TVA's progress in achieving its Climate Challenge Program goals and to discuss possible adjustments to its voluntary commitments.

D. TVA's Climate Challenge Program representative shall be:

Mr. Jerry L. Golden  
Manager, Clean Air Program and Generation Technology  
Tennessee Valley Authority  
Chattanooga, Tennessee 37402-2801

TVA agrees to notify DOE prior to or, in any event, no later than 30-days after any change of its representative.

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#### **DOE's Commitments**

A. DOE's commitments to TVA are those set out in section III of the Climate Challenge Program MOU, which are hereby incorporated in this Accord by reference.

B. DOE will provide an annual report to TVA describing the actions that it has taken to fulfill its commitments under section III and Exhibit C of the Climate Challenge Program MOU and the results of those actions.

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C. DOE's Climate Challenge Program representative, who will serve as liaison to TVA will be:

Mr. Allan Hoffman  
U.S. Department of Energy  
1000 Independence Avenue, S.W.  
Washington D.C. 20585  
(202) 586-1786

DOE agrees to notify TVA prior to or, in any event, no later than 30 days after any change of its representative.

#### **III. General Provisions**

A. Use of DOE-developed materials by TVA will be governed by provisions of section IV of the Climate Challenge Program MOU, which are hereby incorporated in this Accord by reference.

B. In addition to the foregoing provisions, DOE and TVA agree to act in accordance with the principles set out in section I of the Climate Challenge Program MOU and the general provisions set out in subsections V.A - V.D, V.F, and V.G of the Climate Challenge Program MOU, which are hereby incorporated in this Accord by reference.

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C. Either party may withdraw from this Accord or any of its activities under the Climate Challenge Program without penalty and without being subject to remedies at law or equity.

D. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this MOU or to any benefit that may arise therefrom, but this provision shall not be construed to extend to any corporation or unit of Government contracting for its or the public's general benefit.

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Director

## Tennessee Valley Authority

Secretary  
U.S. Department of Energy

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### ATTACHMENT A CO<sub>2</sub> Reduction Activities Undertaken by TVA

The CO<sub>2</sub> reduction estimates identified below are generally derived through the use of a modified reference case that compares the CO<sub>2</sub> equivalent emissions generated by TVA's activities with and without the identified reduction activity.

- 1. Nuclear Unit Operation:** TVA restarted its Browns Ferry Nuclear Unit 2 in August 1991. It plans to restart its Browns Ferry Nuclear Unit 3 and start Watts Bar Nuclear Unit 1 prior to the Year 2000. Operation of these nuclear units is expected to result in annual CO<sub>2</sub> emissions reductions in the Year 2000 of 15,898,000 tons.
- 2. Biomass Cofiring:** TVA has initiated a biomass cofiring test program at its fossil fueled units. The biomass used is wood waste from the wood products industry in the TVA region. Based on these tests, TVA will initiate commercial cofiring projects at various fossil plants that will result in annual greenhouse gas reductions in the Year 2000 equivalent to 2,422,000 tons of CO<sub>2</sub>. In addition to the avoided CO<sub>2</sub> emissions associated with combusting coal, this reduction includes the CO<sub>2</sub> equivalent of avoided methane emissions (approximately 75,000 tons) due to wood waste carbon conversion to CO<sub>2</sub> by combustion rather than conversion to CO<sub>2</sub> and methane by decomposition. A global warming potential of 21 was used for the avoided methane emissions.
- 3. Demand Side Management (DSM) Programs:** TVA has identified a number of DSM programs that may be implemented as a result of its ongoing integrated resource planning (IRP) process. TVA expects to initiate cost-effective DSM programs that will result in estimated annual CO<sub>2</sub> emissions reductions in the Year 2000 of up to 1,383,000 tons.
- 4. Fossil Fueled Unit Efficiency Improvements:** TVA expects to continue to initiate activities to offset thermal performance degradation and to improve the efficiency of its fossil fueled generating units. These activities include improved operation and maintenance, upgrading plant equipment, and upgrading plant instrumentation and controls. The activities TVA completed in 1991 through 1994 to improve unit efficiency are expected to result in annual CO<sub>2</sub> emissions reductions of approximately 1,018,000 tons in the Year 2000. Additional unit efficiency improvement activities TVA plans to initiate in 1995 through 2000 are expected to result in additional annual CO<sub>2</sub> emissions reductions of approximately 459,000 tons in the Year 2000.
- 5. Transmission System Efficiency Improvements:** TVA expects to continue to improve the efficiency of its transmission system and thereby reduce power generation requirements. Such improvements include reconductoring existing transmission lines, constructing new transmission lines, constructing new substations, and replacing transformers. The activities TVA completed in 1991 through 1994 to improve transmission system efficiency are expected to result in annual CO<sub>2</sub> emissions reductions of



approximately 183,000 tons in the Year 2000. Additional transmission system efficiency improvement activities TVA plans to initiate in 1995 through 2000 are expected to result in additional annual CO<sub>2</sub> emissions reductions of approximately 545,000 tons in the Year 2000.

**6. Hydro Modernization Activities:** TVA expects to continue to initiate activities to improve the performance of its hydroelectric generating units such as modernizing and upgrading the turbines and generators to increase their efficiencies. The activities TVA completed in 1991 through 1994 to modernize its hydro facilities are expected to result in annual CO<sub>2</sub> emissions reductions of approximately 20,000 tons in the Year 2000. Additional hydro modernization activities TVA plans to initiate in 1995 through 2000 are expected to result in additional annual CO<sub>2</sub> emissions reductions of approximately 375,000 tons in the Year 2000.

**7. Fossil Fueled Unit Flyash Sales:** Sales of flyash from fossil fueled units to the cement manufacturing industry result in CO<sub>2</sub> reductions due to lower energy consumption and reduced calcination in the manufacturing process. TVA plans to increase its marketing of flyash to the cement industry from approximately 140,000 tons in 1990 to 290,000 tons in the Year 2000. The increased TVA flyash sales are expected to result in additional annual CO<sub>2</sub> emissions reductions in the Year 2000 of 155,000 tons.

**8. Heat Pump Program Activities:** TVA intends to continue to encourage its customers to install efficient heat pumps through such activities as providing low-cost loans and heat pump inspections. The heat pump program activities TVA completed in 1991 through 1994 are expected to result in annual CO<sub>2</sub> emissions reductions of approximately 40,000 tons in the Year 2000. Additional heat pump program activities TVA plans to initiate in 1995 through 2000 are expected to result in additional annual CO<sub>2</sub> emissions reductions of approximately 97,000 tons in the Year 2000.

**9. Utility Forest Carbon Management Program (UFCMP):** TVA is a participant in the UFCMP in which a portfolio of greenhouse gas reduction and carbon sequestration projects will be funded and has committed to provide \$75,000 annually for five years to this effort. The greenhouse gas emissions reductions and carbon sequestration that will result from this program have not yet been identified but TVA's proportionate share is estimated to be equivalent to 50,000 tons of CO<sub>2</sub> annually in the Year 2000.

**10. CFC Management Activities:** TVA expects to continue its activities to manage and phase-out the use of chlorofluorocarbons (CFCs) in TVA-owned equipment. CFC management activities include elimination of venting during equipment maintenance and replacement of high global warming potential CFCs with lower global warming potential materials. The CFC management activities TVA completed in 1991 through 1994 are expected to result in annual greenhouse gas emissions reductions of approximately 8,000 tons CO<sub>2</sub> equivalent in the Year 2000. Additional CFC management activities TVA plans to initiate in 1995 through 2000 are expected to result in additional annual greenhouse gas

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emissions reductions of approximately 1,000 tons CO<sub>2</sub> equivalent in the Year 2000. Global warming potentials ranging from 310 to 8,000 were used for the various affected CFCs to derive CO<sub>2</sub> equivalent tons.

**11. Internal Energy Management Activities:** TVA expects to continue to reduce its internal consumption of energy. This will be done through such activities as the installation of high efficiency electric motors,



building heating and air conditioning efficiency upgrades, and water heating efficiency upgrades. These efficiency improvement activities are expected to result in annual CO<sub>2</sub> emissions reductions of approximately 26,000 tons in the Year 2000.

**12. Transportation Efficiency Improvement:** TVA expects to continue to improve the efficiency of its transportation fleet. For example, TVA's automobile fleet fuel efficiency was increased 0.4 miles per gallon from 1990 to 1993 by replacing less efficient automobiles with more efficient models. The TVA truck fleet fuel efficiency improved by 5.7 miles per gallon from 1990 to 1993. The activities TVA completed in 1991 through 1994 to improve its transportation fleet efficiency are expected to result in annual CO<sub>2</sub> emissions reductions of approximately 5,000 tons in the Year 2000. Additional activities TVA plans to initiate in 1995 through 2000 to improve its transportation fleet are expected to result in additional annual CO<sub>2</sub> emissions reductions of approximately 1,000 tons in the Year 2000.

**13. Forest Management Activities:** TVA expects to continue reforestation and active forest management activities on TVA-owned lands. These activities are planned for approximately 150 acres per year. The activities completed from 1990 to 1994 and planned for 1995-2000 are expected to result in CO<sub>2</sub> sequestration in the Year 2000 of 3,000 tons.

**14. Office Waste Paper Recycling:** Paper recycling results in reduced greenhouse gas emissions from the paper manufacturing industry due to lower energy consumption relative to paper manufacturing using raw materials. Paper recycling from TVA offices is expected to reach 1,700 tons in the Year 2000 resulting in annual CO<sub>2</sub> reductions of 3,000 tons.

**15. Cogeneration:** In 1995, TVA will begin supplying steam in addition to electricity to an industrial customer near TVA's Johnsonville Fossil Plant. This energy supply arrangement will result in an annual CO<sub>2</sub> reduction in the Year 2000 of 23,000 tons compared to previous energy supply arrangements.

**16. Animal Waste Methane Recovery:** TVA expects to implement several animal waste methane recovery and utilization demonstration projects over the next five years. The annual CO<sub>2</sub> equivalent in the Year 2000 of the avoided methane emissions from these projects is expected to be 8,000 tons. A global warming potential of 21 was used to calculate the CO<sub>2</sub> equivalency of avoided methane emissions.

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**17. NOX Emission Reductions:** TVA plans to achieve an approximate annual reduction of 225,000 tons of NOX emissions from its fossil-fueled units by the Year 2000 and intends to begin reporting these in 1997 as part of its Climate Challenge efforts, consistent with DOE's Section 1605(b) Reporting guidelines. These expected reductions would be in addition to the greenhouse emission reduction tonnage commitment made by TVA.

**18. Public Power Initiatives:** TVA is participating with public power industry groups and other public power utilities in the development of industry initiatives for greenhouse gas reductions. TVA commits to continue this effort to develop such reductions and initiatives and to consider participating in appropriate initiatives. Any reductions associated with this activity would be in addition to the greenhouse emission reduction tonnage commitment made by TVA.

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## ATTACHMENT B

### Description of Reference Case

The greenhouse gas (GHG) emissions reductions resulting from many of the actions described in Attachment A are relative to GHG emissions for a **modified reference case** for the Year 2000. The modified reference case emissions are projected using widely accepted electric utility planning techniques and mathematical models. In summary, the models were used to determine the difference between the modified reference case emissions assuming no GHG-reduction activities had been taken and the level of emissions with reduction actions.

The modified reference case emissions for the power system related actions are the result of power system production modeling. The modified reference case model runs were configured to meet the predicted Year 2000 system load with power system resources and performance characteristics that were in service in 1990. An output of the model is predicted CO<sub>2</sub> emissions. Low GHG emitting supply side additions to the system completed or planned for completion since 1990, such as nuclear units and hydroelectric generation facility upgrades, were excluded from the system resources modeled for the modified reference case. Generation load reductions resulting from transmission system upgrades and DSM programs implemented or planned for implementation since 1990 were excluded from the modified reference case model runs. Fossil unit heat rate performance improvements completed or planned for completion since 1990 were excluded from the modified reference case CO<sub>2</sub> emissions predictions. The total system load growth from 1990 to 2000 is expected to be about 34 %. In the modified reference case, the additional load and the absence of new nuclear unit generation is met by combustion turbine capacity additions, pulverized coal fired capacity additions, additional generation from the existing pulverized coal fired capacity, and additional off-system power purchases.

TVA has included the CO<sub>2</sub> emissions associated with the generation of purchased power in its emissions total. Based on historical purchases, it is assumed that the off-system purchased power would be generated by coal fired facilities. In turn, CO<sub>2</sub> emissions associated with the generation of power sold off-system were deducted from total emissions.

The modified reference case emissions from the transportation fleet were predicted by calculating the emissions from a fleet with the average fuel efficiency of the 1990 fleet traveling the vehicle miles predicted for 2000.

The modified reference case emissions for chlorofluorocarbons (CFCs) were predicted by calculating the CO<sub>2</sub> equivalent of CFC emissions based on CFC consumption rates and the types of CFCs in service in 1990.

The emissions reductions resulting from the remaining actions described in Attachment A are relative to the baseline period of 1987-1990, i.e., a **basic reference case**. For example, TVA had no biomass cofiring activities, no animal waste methane recovery activities, and no participation in the Utility Forest Carbon Management Program during the baseline period. For other reduction actions such as flyash sales to the cement manufacturing industry and forest management activities on TVA owned lands, TVA had ongoing activities during the baseline period. For these actions, the reductions are based only on the activities initiated since 1990.

The TVA total modified reference case GHG emissions for the Year 2000 are equivalent to 127.3 million tons of CO<sub>2</sub>. The total GHG emissions reductions, including reductions relative to modified and basic reference cases, are equivalent to 22.7 million tons of CO<sub>2</sub>.





# Climate Challenge Participation Accord

## DOE's Energy Partnerships for a Strong Economy

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### Climate Challenge Participation Accord

This Participation Accord describes the commitments that PacifiCorp and the U.S. Department of Energy (DOE) have made to participate in the Climate Challenge Program in pursuit of the President's goals for reducing greenhouse gas emissions. The Climate challenge Program is a joint, voluntary effort of DOE and the electric utility industry to reduce, avoid or sequester greenhouse gas emissions. The framework of the Climate Challenge Program was established in the Climate Challenge Program Memorandum of Understanding and exhibits thereto dated April 20, 1994 (the Climate Challenge Program MOU) (see Attachment A to this Participation Accord).

#### I. Utility Commitments

##### A.

Consistent with paragraph II.B.1 (a, e and f) of the Climate Challenge Program MOU, PacifiCorp will:

##### 1.

Reduce its emissions rate (in lbs. of CO<sub>2</sub> per MWh) by ten percent between 1990 and 2000. In handling the emissions from the sale and purchase of power, emissions are added to our total when we purchase and subtracted when we sell power. Emissions are assumed, for both sale and purchase, to be from gas resources unless we know specifically otherwise (e.g., purchase from hydroelectric or coal facilities). Emissions rate will change from 2123 lbs/MWh 1911 lbs/Mwh. The company will include the following activities in order to achieve the commitment:

##### a.

Changes in generation mix - Actions that change the mix of resources used to supply energy to our customers.

##### b.

Offset activities - Actions that offset generation emissions through forestry projects and non-forestry projects (e.g., coal ash recycling, ethanol production, methane



capture, etc.)

2.

Pursue projects to cost-effectively reduce, sequester and avoid CO<sub>2</sub> emissions.

Project-by-project descriptions will be provided for projects in the following areas:

a.

Customer demand-side programs

b.

Transmission and distribution efficiencies

c.

Other projects

3.

Participate in the Utility Forest Carbon Management Program.

In order to achieve the commitment under section 1(A)(1):

- **Changes in generation mix** - PacifiCorp intends to take actions necessary to have 200 MWa of renewable resources on line by 2001, if cost-effective. These actions taken alone will reduce emissions by approximately 600,000 tons of CO<sub>2</sub> in 2000 (when modeled against our "base case" resource selection). The company's rate commitment will primarily be achieved through this aggressive acquisition of renewables as well as the use of gas resources and the retention of existing renewable resources (through relicensing hydroelectric facilities).
- **Current forestry projects to sequester emissions** - Since 1992, PacifiCorp has initiated a series of pilot-scale greenhouse gas emissions offset projects. To date the company has invested \$425,000 in four forestry offset projects. These projects are expected to offset a total of 23,928 in the year 2000 and 638,670 tons of CO<sub>2</sub> over the life of the projects. These ongoing projects are described in detail in attachment B.
- **New projects to avoid and sequester CO<sub>2</sub>** - The company intends to spend approximately \$1 million on pilot efforts between 1995 and 2000. Based on our current assumptions, this investment must accrue approximately 700,000 tons of CO<sub>2</sub> in 2000 to accomplish our rate reduction goal. This offset requirement calculation may change with variations in the company's integrated resource plan or market changes. These investments represent a long-term effort to sequester and avoid carbon emissions as well as our effort to find sequestration opportunities that may be expanded in the future if the need arises. The company is exploring a wide variety of projects to pursue as pilots including: reductions in the transportation sector, methane capture at wastewater facilities, applications of lower CO<sub>2</sub> technologies at customer locations.
- **Coal ash recycling** - The company is increasing its effort to recycle coal ash. When used to produce cement, coal ash recycling significantly reduces the amount of energy consumed during cement production and thus results in CO<sub>2</sub> emissions being avoided. PacifiCorp recycled over 390,000 tons of coal ash in the baseline year of 1990. PacifiCorp intends to recycle over 85,000 tons of ash annually (over and above the 1990 baseline amount), so will offset 85,000 tons of CO<sub>2</sub> in the year 2000.



In order to achieve the commitment under section 1(A)(2):

- **Customer demand side programs** - PacifiCorp has displaced 34.9 MWa of generation between January 1, 1992 and 1994 through demand side programs. Based on the company's resource mix, the company has avoided 240,000 tons of CO<sub>2</sub> emissions during this time. For 1995-2000, the company intends, through investment in cost-effective demand side resources, to displace an additional 211 MWa of generation. This estimate is based on our current assumptions and modeling effort and may change as technologies and assumptions vary. Based on the company's resource mix, the company intends to avoid (between 1995- 2000) an additional 1,465,000 tons of CO<sub>2</sub>. In the year 2000, our demand-side activities are expected to displace 40.5 MWa and avoid 283,800 tons of CO<sub>2</sub>. PacifiCorp is committed to developing a diversified portfolio of DSM programs during 1995 -2000 to achieve this goal such as:

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Commercial FinAnswer Program - Through the Energy FinAnswer program, PacifiCorp provides up-front prime rate financing for cost-effective energy conservation measures installed in new commercial buildings. Measures may include: lighting, insulation, HVAC systems, controls or other measures that save electricity beyond code requirements. Repayment of the loan is added to the customer's electric bill as an Energy Service Charge (ESC). Energy cost savings are greater than the monthly ESC, so most customers experience a positive cash flow.

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Industrial FinAnswer Program - The program offers industrial customers opportunity to decrease their energy consumptions by promoting energy efficient design and providing funding for installation of energy conservation measures. Thus far the program has focused on four major technologies: lighting, motors, air compressors systems, and refrigeration.

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Home Comfort - PacifiCorp's Home Comfort program is a retrofit weatherization effort designed to achieve higher rates of customer participation than are typically achieved. The program offers a free home energy check-up, using high-tech diagnostic equipment and the installation of "instant savings measures." These items include: a low-flow showerhead, water heater wrap, faucet aerators, and fluorescent light bulbs.

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New Residential Buildings - The company influences adoption of Model Conservation Standards (MCS) through capturing cost

effective lost opportunities beyond the current code, while working with state and local agencies to promote adoption of MCS.

- **Transmission and distribution efficiencies** - PacifiCorp intends to avoid transmission and distribution system loss through aggressive development of transmission and distribution (T&D) efficiencies. Between 1991 and the present, the company has accomplished approximately 14 aMW of savings through T&D projects and intends to save an additional 16 aMW through additional efforts. These efforts will offset approximately 205,000 tons of CO<sub>2</sub> in 2000. The company's efficiency efforts include:



- Implementation of conservation voltage reduction (CVR) on specific lines.
  - Efficiency improvements at company sub-stations including capacitor installations, use of larger wire on transmission circuits, and conversion of low voltage systems to higher levels.
  - Efficiency improvements through the purchase of more expensive transformers, larger conductors and additional capacitors.
- **Additional projects** - The company is exploring additional projects in the area of forestry on company lands and conversion of fleet vehicles. If these projects are pursued on a larger scale, the company will quantify the relevant 1990 baseline to calculate incremental benefits of these projects. These projects are listed in attachment C.

In order to achieve the commitment under section 1(A)(3):

- **Utility Forest Carbon Management Program** - PacifiCorp has invested \$5,000 in November, 1994 to join the utility carbon management program. We will explore further investment in the program once the cost-effectiveness of this investment has been determined. Any share of our investment that accrues credible and countable carbon benefits in the year 2000 will be counted towards the company's rate commitment in 1(A)(1) and this investment will go towards our \$1 million investment in off-system emission reduction programs.

B.

PacifiCorp will report annually on activities and achievements under the Climate Challenge Program. Results achieved during each year shall be reported in a clear and understandable manner that is

consistent with the guidelines adopted pursuant to subsection 1605 (b) Energy Policy Act and the Climate Challenge accounting protocols in Exhibit B of the Climate Challenge Program MOU. The first such report may include a description of the activities and achievements of PacifiCorp prior to its becoming a participant in the Program, expressed on an annual basis to the extent possible.

C.

PacifiCorp will confer with DOE on or before June 30, 1996 to evaluate jointly the progress of the company in achieving its Climate Challenge Program goals and to discuss possible adjustments to its voluntary commitments.

D.

The Climate Challenge Program representative for PacifiCorp will be Tom Imeson, 700 NE Multnomah, Suite 1600 Portland, OR 97232. PacifiCorp agrees to notify DOE prior to or, in any event, no later than 30 days after any change in the contract

## **II. DOE Commitments**

A.

DOE's commitments to PacifiCorp are those set out in section III of the Climate Challenge Program MOU, which are hereby incorporated in this Participation Accord by reference.

B.

DOE will consider PacifiCorp requests to intervene in regulatory proceedings of federal, state and local commissions and boards on issues pertinent to the Climate Challenge Program. Before DOE, intervenes in regulatory and other proceedings pertaining to PacifiCorp for purposes of addressing Climate Challenge Program issues, it will provide notice to the company.

C.

DOE will provide an annual report to PacifiCorp describing the actions that it has taken to fulfill its commitments under section III and Exhibit C of the Climate Challenge Program MOU and the results of those actions.

D.

The Climate Challenge Program representative for DOE, who will serve as liaison to the company, will be Allan Hoffman, Department of Energy, Room 6B-128 (EE-10), 1000 Independence Avenue SW, Washington DC 20585 (202)586-1786. DOE agrees to notify PacifiCorp prior to or, in any event, no later than 30 days after any change in liaison responsibilities or personnel.

### III. General Provisions

A.

Use of DOE-developed materials by PacifiCorp will be governed by the provisions of section IV of the Climate Challenge Program MOU, which are hereby incorporated in this Participation Accord by reference.

B.

In addition to the foregoing provisions, DOE and PacifiCorp agree to act in accordance with the principles set out in section I of the Climate Challenge Program MOU and the general provisions set out in subsections V.A-V.D, V.F and V.G of the Climate Challenge Program MOU, which are hereby incorporated by reference.

C.

Either party may withdraw from this Participation Accord or any activities under the Climate Challenge Program without penalty without being subject to remedies at law or equity.

(Original signed by)

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President and Chief Executive Officer  
PacifiCorp

(Original signed by)

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Secretary of Energy  
U.S. Department of Energy

Attachments:

Attachment A - Climate Challenge Program MOU and exhibits

Attachment B - Ongoing Forestry Projects



## Attachment C -- Additional Projects

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### Attachment B - Ongoing Forestry Offset Projects

The company had developed four ongoing efforts to test cost-effective way to offset emissions through forestry. These projects are as follows:

- Reforestation of privately unforested private lands in cooperation with the Oregon Department of Forestry. This project resulted in over 600 acres planted.
- Shade tree planting around ten different Utah neighborhoods and individual sites. Conducted in partnership with nonprofit organization TreeUtah.
- Reforestation effort in eastern Washington to replant privately-owned lands that were devastated by fire. Organized in cooperation with the Upper Columbia Resource Conservation and Development Council.
- Investment in the Oregon Forest Resource Trust that funds planting on unforested and understocked lands. By combining company's \$75,000 investment with state funds, Trust can reforest 5,250 acres in the near term. Long-term goal is to plant 250,000 acres in 15 years.

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### Attachment C - Additional Projects

PacifiCorp will explore proceeding with a variety of other projects. They are as follows:

- **Management of Company Lands** - The company owns approximately 13,000 acres of forested land managed in association with our hydroelectric facilities. Much of the land is intensively managed through aggressive reforestation and careful land management. These practices yield CO<sub>2</sub> benefits when compared with either natural regeneration or with reforestation practices required under state forest practices acts. Within the next year, the company will develop methods to quantify these carbon benefits. Only post-1992 carbon benefits in excess of those achieved during the 1990 baseline would be counted towards a project-by-project commitment.
- **Fleet Conversions** - PacifiCorp currently owns three converted electric vehicles and six vehicles fueled by natural gas as part of our fleet. Our number of alternative fueled vehicles will be increasing steadily (to approximately 200 vehicles by 2000) and these purchases will accrue CO<sub>2</sub> benefits when compared to internal combustion vehicles. PacifiCorp also is exploring a variety of larger-scale business opportunities that would allow us to have a significant impact on CO<sub>2</sub> emissions through alternative fueled vehicles.

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# Climate Challenge Participation Accord

## DOE's Energy Partnerships for a Strong Economy

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### Climate Challenge Participation Accord

This Participation Accord describes the commitments that the American Electric Power System (AEP) and the U.S. Department of Energy (DOE) have made to participate in the Climate Challenge Program in pursuit of the President's goal for reducing greenhouse gas emissions. The Climate Challenge Program is a joint, voluntary effort of DOE and the electric utility industry to reduce, avoid or sequester greenhouse gas emissions. The framework of the Climate Challenge Program was established in the Climate Challenge Program Memorandum of Understanding and exhibits thereto dated April 20, 1994 (the Climate Challenge Program MOU) (see Attachment A to this Participation Accord).

#### I. AEP Commitments

##### A.

Consistent with paragraph II.B.1 (a and f) of the Climate Challenge Program MOU, AEP will undertake the following programs, projects and actions to reduce, avoid or sequester greenhouse gas emissions:

- Fossil power plant efficiency improvement program
- Adjustable speed drive motor pilot program
- Transmission & distribution system efficiency improvement program
- 415 MW coal to natural gas conversion project
- Hydroelectric facilities refurbishment program
- Nuclear plant availability and capacity increase
- Demand side management program
- Green Lights program participant
- Enhanced forest management and tree planting program
- Increase sales of fly ash to cementitious products markets

In addition, AEP will actively promote to its customers the use of electrotechnologies that can result in an improvement in energy efficiency and a reduction in emissions.

Finally, AEP will participate in the following industry-wide Climate Challenge initiatives:

- The Utility Forest Carbon Management Program



\$5,000 initial commitment in 1994

- The Earth Comfort Geothermal Heat Pump Program  
\$50,000/year for 5 years initial commitment in 1995
- Envirotech - The Electrotechnology and Renewable Energy Investment Pool  
Up to \$5,000,000 initial commitment in 1995
- EV America  
Commitment to purchase EVs, number and cost unknown at this time

A more complete description of these programs, projects and actions is included in Attachment B.

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B.

AEP will report annually on activities and achievements under the Climate Challenge Program. Results achieved during each year will be reported in a clear and understandable manner that is consistent with the guidelines adopted pursuant to subsection 1605(b) of the Energy Policy Act and the climate program accounting protocols in Exhibit B of the Climate Challenge Program MOU. The first such report may include a description of the activities and achievements of AEP prior to its becoming a participant in the Program, expressed on an annual basis to the extent possible.

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C.

AEP will confer with DOE on or before January 1, 1998 to evaluate jointly AEP's progress in achieving its Climate Challenge Program goals and to discuss possible adjustments to its voluntary commitments.

D.

The Climate Challenge Program representative for AEP will be:

Dale E. Heydlauff, Vice President - Environmental Affairs  
American Electric Power Service Corporation  
1 Riverside Plaza  
Columbus, Ohio 43215

AEP agrees to notify DOE prior to or, in any event, no later than 30 days after any change in the contact.

## II. DOE Commitments

A.

DOE's commitments to AEP are those set out in section III of the Climate Challenge Program MOU, which are hereby incorporated in this Participation Accord by reference.

B.

DOE will consider AEP's requests to intervene in regulatory proceedings of federal, state and local commissions and boards on issues pertinent to the Climate Challenge Program. Before DOE intervenes in regulatory and other proceedings pertaining to AEP for purposes of addressing Climate Challenge Program issues, it will provide notice to AEP.

C.

DOE will provide an annual report to AEP describing the actions that it has taken to fulfill its commitments under section III and Exhibit C of the Climate Challenge Program MOU and the results of those actions.

D.

The Climate Challenge Program representative for DOE, who will serve as liaison to AEP, will be:

Allan Hoffman  
U.S. Department of Energy  
Room 6B-128 (EE-10)  
1000 Independence Avenue SW  
Washington, DC 20585  
202-586-1786

DOE agrees to notify DOE prior to or, in any event, no later than 30 days after any change in liaison responsibilities or personnel.

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### III. General Provisions

A.

Use of DOE-developed materials by AEP will be governed by the provisions of section IV of the Climate Challenge Program MOU, which are hereby incorporated in this Participation Accord by reference.

B.

In addition to the foregoing provisions, DOE and AEP agree to act in accordance with the principles set out in section I of the Climate Challenge Program MOU and the general provisions set out in subsections V.A-V.D, V.F. and V.G. of the Climate Challenge Program MOU, which are hereby incorporated by reference.

C.

Either party may withdraw from this Participation Accord or any of its activities under the Climate Challenge Program without penalty and without being subject to remedies at law or equity.

Dr. E. Linn Draper, Jr. Date  
Chairman of the Board, President and  
Chief Executive Officer  
American Electric Power Company, Inc.

Secretary of Energy or designee Date  
U.S. Department of Energy

Attachment:

Attachment A - Climate Challenge Program MOU and exhibits



## Attachment B - Description of AEP Climate Challenge Plan

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### Attachment B - AEP's Climate Challenge Plan

The programs and initiatives included in the AEP Climate Challenge Plan fall into five areas: supply-side, demand-side, land management, industry initiatives and miscellaneous. A description of the components of each of these areas follows:

**Supply-side Activities.** The evaluation of on-going and potential future programs and activities in the supply-side area determined that emissions savings were occurring and would continue to occur in the areas of fossil plant heat rate improvements, use of natural gas in place of coal, hydroelectric generation life extension and efficiency improvements, nuclear plant availability and capacity increases and transmission and distribution system energy loss reductions. In the area of **fossil plant heat rate improvement**, a significant number of capital improvements or operational changes were identified that have already been undertaken since 1/1/91 or could potentially lead to improvements in individual unit heat rates. Examples of these activities include the use of **adjustable speed drive motors** for certain applications in the power plants, operating fossil units within a load range that optimizes heat rate while maintaining economic dispatch, reblading steam turbines to improve turbine efficiency, taking auxiliary equipment out of operation to reduce auxiliary power losses, and others. In addition, a target heat rate improvement level was established for the AEP System to be achieved by 2000. While many of these activities were occurring already, AEP will investigate other innovative ideas for improving fossil plant efficiency due to the attention given to the Climate Challenge program and the potential benefits of reducing CO<sub>2</sub> emissions.

AEP is **converting three small coal units to natural gas-burning capability** in 1995 in what is referred to as a "dual-firing" mode as an acid rain compliance measure. AEP will operate these units on natural gas when it is cost-effective to do so, factoring in the value of SO<sub>2</sub> allowances. Based on projections in the compliance plan of the amount of generation expected from these units when on gas and the differential CO<sub>2</sub> emission rate of natural gas compared to coal, an estimate of emissions savings is included in the Climate plan.

The operation of AEP's **conventional hydroelectric generation** (16 facilities totaling 271 MW) avoided roughly 1 million tons of CO<sub>2</sub> in 1990. Many of these units are nearing the end of their expected operating lives. In addition, the turbines in many of the units are outdated and not as efficient as turbines available today. In the late 1980s and early 1990s, AEP undertook a program to increase the efficiency and extend the lives of its hydroelectric facilities. The program was expanded in 1994 due in part to the Climate Challenge. Without this program, much of the capacity would likely have been taken out of service before the year 2000. With the program, these units will remain in service, in some cases with increased capability. These measures have been included in the Climate Challenge plan, with a generation projection from the units based on a normal hydrological year and an emissions projection based on the assumption that the generation would come from coal-fired units on the AEP System if it does not come from the non-CO<sub>2</sub> emitting hydroelectric units.

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AEP has two nuclear units as part of its system, totaling 2,110 MW. Since the early 1990s, an intensive program has been established to **increase the availability of the AEP nuclear units** by reducing the forced outage rates and decreasing the lengths of refueling outages. This program is consistent with efforts being undertaken throughout the industry to improve nuclear plant operations. AEP will continue to implement its strategic plan for the 2,110 MW nuclear plant. If the AEP program is successful, projected electric generation from the plant may increase as much as 40% compared to levels seen in 1990 and during many years in the 1980s. In addition, AEP's Nuclear Engineering Department is undertaking a project to **increase the capability**



of one of the nuclear units by 60 MWe. Similar to the hydroelectric units, the emissions savings that will result from increased output from these units is based on the assumption that the generation would instead come from coal-fired units on the AEP System.

Potential emissions savings from **activities on the transmission and distribution system** fall into two categories. AEP has an active program of transmission line construction to meet the needs of its customers and to maintain the reliability of the transmission system in its geographical region of the country. In many cases, the addition of a new transmission line will allow energy to flow through the system more efficiently, thus reducing line losses. This directly translates to emissions savings as it results in less electricity being generated to meet a given customer demand. AEP's T&D Services Department also continually evaluates programs to reduce line losses for the existing transmission system. The combined effect of planned additions to the system and planned improvements in the system in the 1990-2000 timeframe have been included in the Climate plan and form part of AEP's commitments.

On the distribution side, AEP has an on-going program to upgrade the electrical equipment in its distribution system. A portion of this activity is planned maintenance to insure reliability of the system and a portion is unplanned in response to equipment failures. Much of the equipment being replaced has been in operation for many years. The replacement equipment tends to be more efficient due to improvements in technology, which will automatically result in a reduction in distribution losses. This translates into emissions savings on the same basis as for the transmission system. AEP will continue its distribution system maintenance program. The emissions savings calculation for the transmission and distribution system energy loss savings is based on an average CO<sub>2</sub> emission rate for the AEP System that factors in non-fossil generation with fossil-based generation.

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**Demand-side Activities.** Like many utilities, AEP has a demand side management (DSM) program aimed at altering the amounts and patterns of its customers' electricity use. To the extent that such a program results in a reduction in the amount of electricity generated to meet customer demand, emissions savings will occur. AEP has implemented and will continue to implement a diversified portfolio of DSM projects, examples of which include:

- Project Good Turn refrigerator recycling program
- Targeted Energy Efficiency residential weatherization program
- Neighborhood Energy Watch residential weatherization program
- SMART Financing Program (commercial & industrial)
- TranstexT residential energy management system

The CO<sub>2</sub> emissions savings projected for the year 2000 from this level of effort were included in the final Climate Challenge plan. The emissions calculation is based on the assumption that the reduction in generation associated with the end-use energy efficiency improvement occurs at AEP fossil plants.

**Land Management Activities.** AEP has a long history of tree planting and land management programs. CO<sub>2</sub> savings can occur both from planting new trees and increasing forest stand productivity through aggressive land management techniques. Such efforts would continue even without the Climate Challenge program. However, the emphasis on CO<sub>2</sub> emissions brought about from participation in the Climate Challenge has resulted in a renewed focus on AEP's land management activities. As a result, both the tree planting and land management programs will be expanded between 1994 and 2000. Ultimately, AEP will plant up to 15 million new trees during this period, and bring 15,000 additional acres of existing forest lands under more aggressive management. All of these activities have been included in the Climate Challenge plan.



**Miscellaneous.** The AEP Climate Challenge plan includes three additional areas that hold the potential for CO<sub>2</sub> emissions savings. The first, U.S. EPA's Green Lights program, is in some respects a DSM program, but on AEP's side of the electric meter. AEP became a Green Lights utility ally in 1992, and is in the process of conducting lighting retrofits in its facilities. Under the current schedule, AEP will complete the lighting retrofit program in 1997. The energy savings projected to occur from this effort, reaching a peak of 47 million kwh/year in 1997, have been included in the plan. AEP is also an aggressive marketer of coal ash for use in commercial products. One of these uses, fly ash in place of cement in the manufacture of concrete products, can result in significant energy and emissions savings. AEP will continue to aggressively market coal by-products, and a fly ash utilization program has been included in the plan. Finally, AEP, as well as many other utilities, is developing an electrotechnologies marketing program to identify and promote the use of electric technologies to replace the direct use of fossil fuels. Many such technologies can result in an overall improvement in energy efficiency and reduction in emissions even though the generation of electricity increases. While the AEP Climate Challenge plan recognizes the role of electrotechnologies, an emission savings projection was not developed at this time.

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**Industry-wide Initiatives.** The electric utility industry recognized early in the Climate Challenge development process that the combined resources of many companies could be an effective approach to achieving emissions savings in a cost-effective manner. Through the efforts of the Edison Electric Institute, five industry-wide initiatives were developed during 1994. AEP will participate in four of these initiatives as part of its Climate Challenge plan:

- The Utility Forest Carbon Management Program  
\$5,000 initial commitment in 1994
- The Earth Comfort Geothermal Heat Pump Program  
\$50,000/year for 5 years initial commitment in 1995
- Envirotech - The Electrotechnology and Renewable Energy Investment Pool  
Up to \$5,000,000 initial commitment in 1995
- EV America  
Commitment to purchase EVs, number and cost unknown at this time

As these initiatives are still in a developmental stage, an emissions savings projection was not included in the AEP plan. However, as the initiatives are implemented and emissions savings occur, a share of these savings will be credited to AEP.

**Emissions Savings Projection.** The CO<sub>2</sub> emissions savings projection for the year 2000 from each of these program areas is:

|                         |                          |
|-------------------------|--------------------------|
| Supply-side activities  | 8.31 million tons        |
| Demand-side activities  | 0.78 million tons        |
| Land management & Misc. | 0.46 million tons        |
| <b>Total</b>            | <b>9.55 million tons</b> |

**Considerations.** It is important to note the programs included in this Climate Challenge Participation Accord and the emissions savings projected to occur from implementation of these programs are based on the best projections available at the time the Accord goes into affect. Changing circumstances either within AEP or external to AEP could materially affect the actual emissions savings that will be achieved under this Climate Challenge Participation Accord.